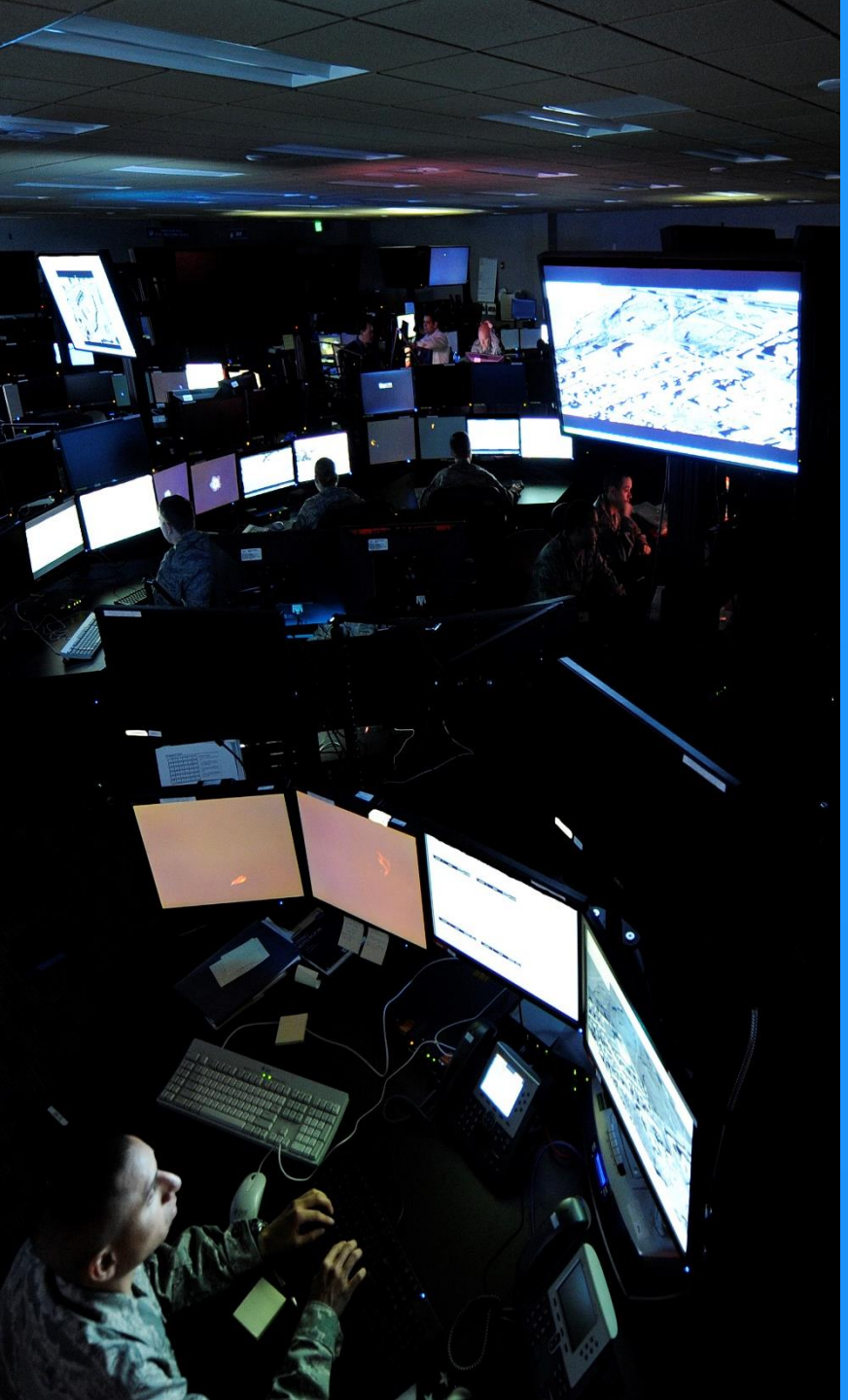

DECISIVE ANALYTICS

Full Motion Video Automation

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Solution

- Object-based capability to identify objects abd activities of interest (OOI and AOIs) in video stream
  - Improve focus, decrease strain, and operator overload
- Move analyst focus to video segments based on OOI and AOI detection
  - Moves analyst cognitive skills to the most relevant and salient data

Our Technical Innovations

Requirement	Technique	Innovation
Camera and Platform Stabilization	Parallax Free Motion Model	Uses full 3D physics of the scene as observed by the sensor and platform
Generate a complete and accurate scene	Mosaic Generation	Uses a graph-cut technique to create seamless mosaics and background
Identify changes in the scene	Per Pixel Foreground Labeling	Uses per pixel learning which builds confidence in the change
Aggregate pixels into candidate objects	Object Detection	BLOB-ization, morphological operators, and filtering
Track detected object over time	Object Tracking	Uses Kalman Filtering and Multiple Hypothesis Tracking
Accurately identify OOIs and AOIs by removing false alarms	Motion and Geometric Context Model	Remove objects that violate physics-based motion models and geometric and scene context

Differentiators

- Based on $60M of Government R&D funding
  - Governments Purpose Rights software (GPR)
  - Deployed with DCGS-N Inc 2 FCR 0
    - Demonstration within Trident Warrior 2016
  - Deployed within AVAA

- Benefits
  - Provide rapid analysis on large-scale datasets 24/7
  - Catalog and storage of important events
  - Search and forensic analysis
  - Allows analysts to focus on achieving mission goals

Results on DARPA VIRAT Data set

Video Feed	Elapsed Time	Total Frames	Frames w/ OOI or AOI	Percentage of OOI/AOI
Sensor Feed 1	1:48	6532	1420	21.7%
Sensor Feed 2	1:23	4985	390	7.8%
Sensor Feed 3	1:06	4004	413	10.3%
Sensor Feed 4	1:52	6750	1159	17.1%
Sensor Feed 5	1:26	5189	0	0%
Sensor Feed 6	0:53	3214	0	0%

- Over all 6 feeds, 11.0% of the data contained OOIs/AOIs
- Reduced operator work load by 89%
- Enables shift of 89% of cognitive workload to the most important 11%
  - Increased event classification accuracy
  - Reduced event dissemination timelines

Summary and Conclusions

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Expertise

- Algorithm development
- Cloud computing
- Software development
- Data wrangling

SBIR and BAA (GPR) Developed Toolkit

- Natural Language Processing
- Imagery & Video Processing
- Data Wrangling